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ZDENEKIUS, A NEW GENUS OF NEARCTIC TORYMIDAE (HYMENOPTERA: CHALCIDOIDEA)

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Abstract.—***Zdenekius smithi***, new genus, new species is described. This nearctic genus of Torymidae is transcontinental across the northern United States extending into southeastern Canada. *Zdenekius* is reared in association with twig-nesting Sphecidae and Vespidae, but the exact host relations are not known. It may be a primary and/or a secondary parasite on dipterous and hymenopterous parasites of these wasps.

Key Words: Insecta, Torymidae, *Zdenekius smithi*, new genus, new species, Nearctic, parasite, Sphecidae, Vespidae

The following description is presented to validate a generic name to be used in a forthcoming publication entitled *Keys to the Genera of Nearctic Chalcidoidea*. This multi-authored manual will summarize our knowledge of nearctic genera of the superfamily but will not include descriptions of new taxa. I take this opportunity, therefore, to describe the only new nearctic genus of Torymidae discovered during my research toward a world generic reclassification. This research is nearing completion but will not be published before the nearctic key.

During many years of study, I have found numerous undescribed nearctic species of Torymidae that were difficult to place to genus. These taxa, as well as the known world genera, have been studied over a period of years using phylogenetic methods (Grissell, in prep.). Of nearctic taxa, only the one described below could not be integrated into a generic hierarchy without creating paraphyly. The superfamily Chalcidoidea is rife with monotypic genera, and I am reluctant to describe yet another myself. I have attempted to reflect phylogenetic patterns as objectively as possible while at the same time creating the least number of nomenclatural changes. That only a single new nearctic genus is being described, despite discovery of nearly two dozen new species, indicates I believe, that the generic limits of Torymidae, at least in the Nearctic, are becoming well-known relative to other families of Chalcidoidea such as Pteromalidae.

Zdenekius Grissell, New Genus
(Fig. 1)

Type species.—*Zdenekius smithi* Grissell, new species, present designation.

Diagnosis.—Occipital carina located nearer to occipital foramen than to dorsum of head and somewhat flattened along dorsal margin, ventrally reaching upper rim of hypostomal carina (Fig. 2); frenal sulcus weakly expressed as a depression in the otherwise evenly sculptured scutellum; hindfemur submedially enlarged with a single tooth (Fig. 9); hindtibia straight with apical, unmodified spurs; metasternum with broad square to transverse median area between hindcoxae (Fig. 13); metasoma of female (Fig. 5) dorsoventrally flattened, with broadly sclerotized sterna not overlapped

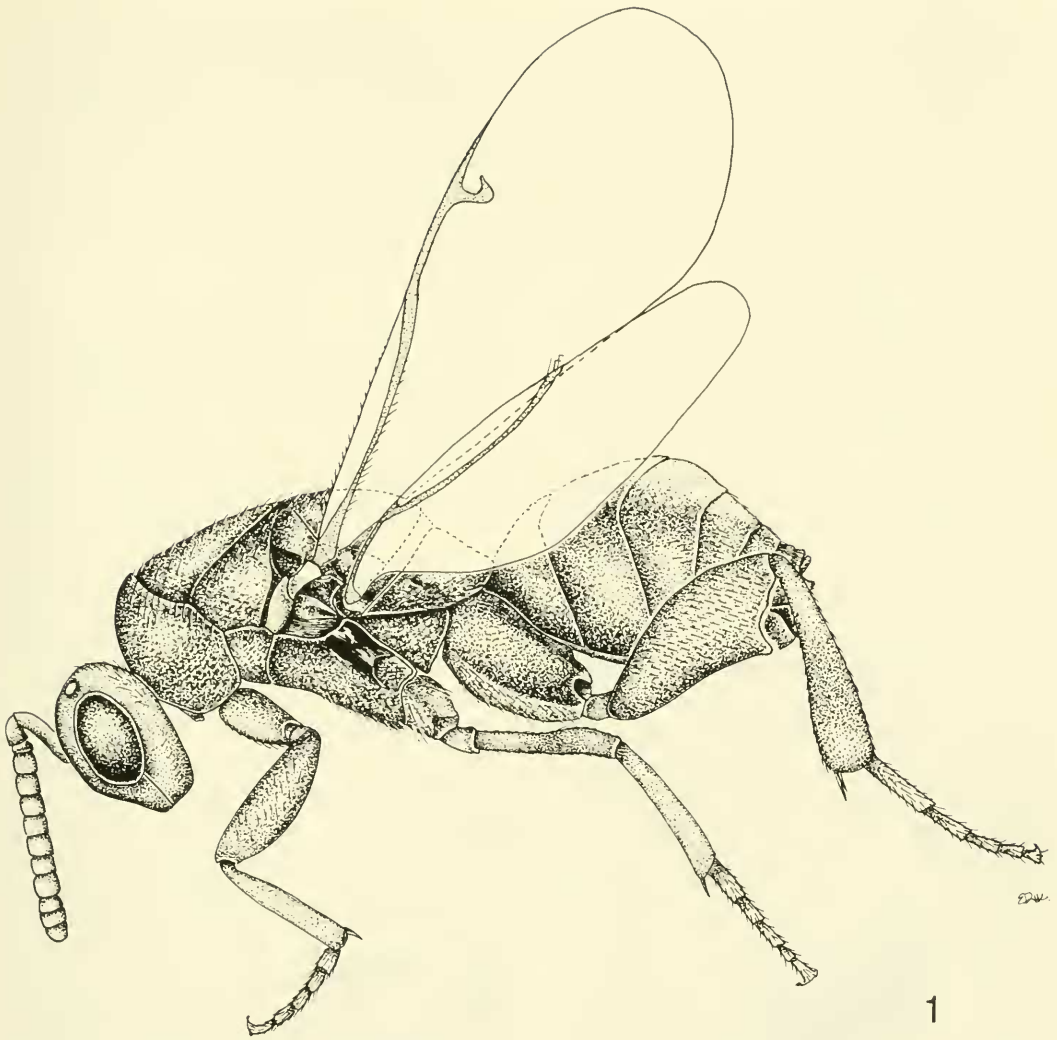
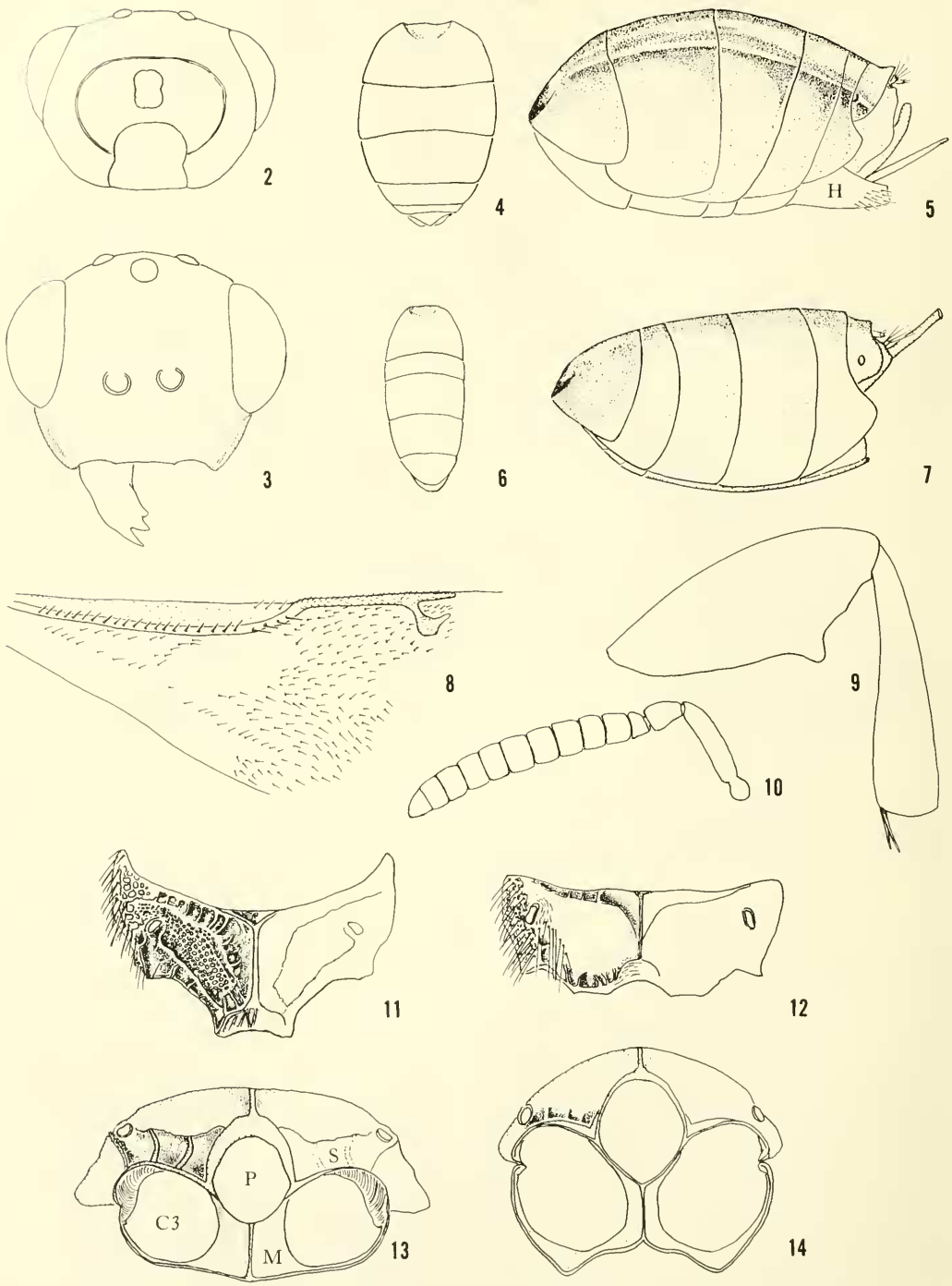


Fig. 1. *Zdenekius smithi*, female, habitus.

by terga (i.e. sterna are easily seen as flattened plates in ventral view), hypopygium broadly plow-shaped, and ovipositor sheaths curved upward and not exserted.

Description.—Occipital carina nearer to occipital foramen than dorsum of head and flattened along dorsal margin, ventrally reaching upper rim of hypostomal foramen (Fig. 2); antenna (Fig. 10) with 1 anellus, club 3 segmented (filiform); head in dorsal view transverse; clypeal apex straight (Fig. 3); malar keel absent; submarginal vein (Fig. 8) with normal, weakly developed bristles that are shorter than tegula; marginal vein greater than 3× length of stigmal vein; stigmal and postmarginal veins subequal in length; hindfemur submedially enlarged with single tooth (Fig. 9); hindtibia straight, with 2 apical unmodified spurs of nearly equal length (Fig. 9); frenal sulcus weakly indicated as broad depression; notauli distinct, not meeting scutoscutellar suture, intersecting it laterally outside anterior edge of scutoscutellar suture; propodeum (Fig. 11)



Figs. 2–14. Figs. 2–5, 8–11, 13, *Zdenekius smithi* (female); Figs. 6, 7, 12, 14, *Monodontomerus obsoletus* (female). 2, 3, head (posterior, anterior, respectively); 4–7 metasoma (4, 6 dorsal view, 5, 7 lateral view; 6, ovipositor omitted; 7, only basal part of ovipositor shown; H = hypopygium). 8, Forewing. 9, Metafemur and tibia. 10, Antenna. 11, 12, Propodea. 13, 14, Metasterna (C3 = metacoxal foramen, M = metasternal plate, P = propodeal foramen, S = spiracular sulcus).

with median depression triangular and extending to nucha, with median carina appearing as extension of nucha, and with spiracular sulcus deeply pitted and extending from posterior of spiracle to nucha (Figs. 11, 13); metasternum (Fig. 13) with propodeal foramen and hindcoxal foramina abutting only tangentially, metasternal area between hindcoxal foramina a square or transverse plate subequal in width to diameter of a hindcoxal foramen, heavily sclerotized and with strong median carina; mesopleuron and metapleuron ventrally of equal length in lateral view, metasternal shelf absent; metasoma (Fig. 5) dorsoventrally flattened with broad sterna which are not ventrally completely overlapped by the terga (i.e. the sterna are easily seen as flattened plates in ventral view), metasomal terga nonemarginate, MT 6 with posterior margin obtusely concave in profile, ovipositor sheaths curved upward and appressed to MT 8, not exserted, hypopygium prominent, broadly plow-shaped.

Etymology.—This genus is named in honor of Zdenek Bouček, who discovered the first specimens and referred them to me for study. More than any other worker, Bouček has contributed to the understanding of the Chalcidoidea as we know them.

Relationships.—Having studied all genera of monodontomerines in preparation for a world reclassification of the complex of genera associated with Monodontomerinae/Toryminae, I hypothesize that *Zdenekius* is a member of the Monodontomerini based upon the following synapomorphies: occipital carina located nearer to occipital foramen than dorsum of head (Fig. 2), dorsally nearly straight (rather than arched), and reaching or nearly reaching upper rim of hypostomal foramen (Fig. 2); propodeum (Figs. 11, 12) with sublateral foveae on either side of a median carina, spiracular sulcus evident and reaching (or curved towards) nucha, and callus convex and setose; no metasternal shelf; 1 anellus (rarely 2); and hindfemur with a single, abruptly produced tooth (Fig. 9; or enlarged and with 1 or 2 rows of teeth in extralimital genera).

Zdenekius, based upon its metasternum, is hypothesized to be the sister taxon of a clade that includes *Monodontomerus.* In my unpublished phylogenetic work, the state of widespaced hindcoxal foramina (i.e. with a wide plate between them) is considered primitive with respect to narrowly spaced foramina with a narrow plate between them. In *Zdenekius* the metasternal plate (Fig. 13, M) is square or transverse and subequal in width to the diameter of a hindcoxal foramen. In *Monodontomerus* (Fig. 14) the metasternal plate is narrowly longitudinal and much narrower than the diameter of a hindcoxal foramen. The narrowness in *Monodontomerus* is apparently caused by an increase in coxal size and a correlated increase in foramen size (cf. Figs. 13 and 14, C3).

Females of *Zdenekius* have an autapomorphically structured metasoma. The metasomal terga (Fig. 5) are dorsally flattened, making the abdomen broad when viewed from above (Fig. 4), and the sterna are visible as broad, flat, heavily sclerotized plates that are not covered by the terga. Most notable is the hypopygium, a broad, plow-shaped sternum that arises at the apex of the metasoma. In other Monodontomerini (and most other torymines as well) the metasoma is not dorsally flattened (Fig. 7) and is thus narrowly oval (or parallel-sided) when viewed from above (Fig. 6), and the metasomal terga meet ventrally and conceal the sterna almost entirely. Rarely are the sterna exposed, in which case they are grouped at the base of the metasoma and are weakly sclerotized. If the hypopygium is seen at all in these taxa, it appears as an apically pointed structure (Fig. 7), but this is due more to the lack of lateral sclerotization than to its actual shape. Usually the hypopygium extends halfway or more to the base of the metasoma and is the only readily

apparent sternum. The metasoma of males of *Zdenekius* are not so modified but appear instead as typical male *Monodontomerus.*

The host association with aculeate Hymenoptera is certainly similar to that of *Monodontomerus,* many of which are parasites of solitary bees and wasps. Hyperparasitism is commonly found in *Monodontomerus* as well, and this mode of parasitism also fits the possible behavior of *Zdenekius* (see hosts, below).

Zdenekius smithi Grissell, New Species
(Figs. 1–5, 8–11, 13)

Holotype female.—Body length 3.4 mm. Metallic blackish green, except scape and tibiae yellow. Face subquadrate in outline (Fig. 3), ratio width : height as 7:5; clypeus recessed (i.e. lying within imaginary line drawn between lateral corners of oral fossa); intermalar distance 2.0× malar distance; malar sulcus faintly indicated as shallow depression; torulus about own diameter above ventral level of eye; eye essentially without setae; scape almost reaching midocellus, 2.6× length of pedicel (Fig. 10), anellus slightly wider than long (5:7), F2 quadrate, remainder wider than long; mesepimeron heavily reticulately sculptured ventrally, dorsally more lightly sculptured except for slight smooth area just above epimeral depression; frenum 0.3× length of scutellum, as heavily sculptured as anterior of scutellum, frenal sculcus weakly expressed, anteriorly with broad depression, posterior rim of even width and evenly punctate; dorsellum reticulately sculptured, with obscure median carina; propodeum with median depression triangular and extending to nucha, median carina strong (Fig. 11), submedially as heavily reticulately sculptured as hindcoxa, posterior margin with deeply pitted spiracular sulcus extending from nucha to posterior of spiracle (Figs. 11, 13); forewing (Fig. 8) costal cell on anterior margin with 2 or 3 setae dorsally at distal apex, ventrally almost completely setose except for bare area in basal ⅓, cubital and basal veins setose, basal cell with partial setal row (in left wing, right wing with 3 setae), dorsal admarginal setae reaching to marginal vein and parastigma, stigma squarish, uncus subequal to width of stigma, stigmal area hyaline; hindcoxa with dorsal setae; hindfemur 2.7× as long as wide; hindfemoral tooth as in Fig. 9; longest hindtibial spur ca. 0.5× shortest length of basitarsis; metasoma dorsally flattened (Fig. 5); metasomal tergum 2 with reticulate sculpture in depression posteriad of petiole and laterally on sides, otherwise faintly alutaceously sculptured; ovipositor free from sheaths and extended at acute angle (but see variation, below).

Allotype male.—Length 2.5 mm. Differs from female as follows: intermalar distance 2.3× malar distance; scape 2.3× length of pedicel, 3.2× longer than wide, essentially cylindrical but slightly ventrally flattened, ventrally polished, no pores visible at 100×, asetose; funicular 2 wider than long.

Variation.—Females range in length from 2.1 to 3.4 mm, males from 2.3 to 3.2 mm. Body color is constant for the species in spite of its wide-ranging distribution. Sculpturing on metasomal tergum 2 varies within populations from polished to faintly alutaceous. In one female (of 3 from Louisa County, Virginia) tergum 2 is entirely heavily sculptured (i.e. tergum 2 and 3 equally reticulate). The other two specimens from the same series have tergum 1 faintly alutaceous. A single female from Prince Georges County, Maryland, is heavily sculptured as well. Because only 2 specimens of 46 show this condition, and it does not appear to be consistent within a population, I presume that this character is variable for the species. Another variable character is the posterior margin of the propodeum. In larger specimens a carina runs laterally from the nucha nearly to the posterior margin of the spiracle. This carina is prominent when viewed from above (Fig. 11) and delimits a channel-like groove (spiracular sulcus) that is best viewed from the side or below (Fig. 13).

This channel has a few perpendicular carinae. In smaller specimens the corresponding carinae become less prominent and the channel less obvious. In the holotype and most other specimens the ovipositor is free from the sheaths and projects at an acute angle as a short barb, but this is not true of all specimens. When the ovipositor is not projecting, this species appears to have no ovipositor.

Holotype.—Female, near Annandale, Fairfax County, Virginia, USA, 23 June 1986, D. R. Smith, Malaise trap, in USNM collection.

Paratypes.—32 females, 16 males as follows (all United States National Museum unless otherwise stated; CNC = Canadian National Collection, Ottawa; NHM = The Natural History Museum, London). USA.—Virginia: 10 females, same data as holotype except collected from 25 May to 24 August 1986–1987; 3 females, 4 mi. S. Cuckoo, Louisa County, 13 May to 5 July 1986–1987, K. Kloke, D. R. Smith, Malaise trap (USNM, CNC, NHM); 1 male, Black Pond, Fairfax County, "reared" 8 February 1921, dead willow (see hosts, below). Michigan: 1 male, Ann Arbor, June 1976, I. Gauld (NHM); 1 female, Midland County, 21 July 1952, R. R. Dreisbach. Oregon: 2 males, Prineville, "6-3-35," R. L. Furniss, W. J. Buckhorn, ex *Alnus rubra* (see hosts, below). New Hampshire: 1 male (11 September 1956) and 1 female (1 November 1982), Durham, 11 September 1956, W. J. Morse. Washington, D.C.: 1 male (no other data). Illinois: 1 male, Algonquin, "5-21-96." Maryland: 1 female, Patuxent Research Station, Prince Georges County, 15–21 June 1986, D. Wahl; 2 specimens (sex unknown), Woodstock, E. G. Reinhard, "Par. in nest *Symmorphus debilis*" (see hosts, below). CANADA.—Ontario: 11 females, Hamilton, 4 June to 14 August 1980–1982, M. Sanborne, Malaise trap (CNC); 5 females, 1 male Ottawa, 20 July to 10 August 1986, H. Goulet, Malaise trap (USNM, CNC). Quebec: 1 male, Mont Royal, Montreal, August 1956, J. Obenberger (NHM). New Brunswick: 1 female, Kouchibouguac National Park, 25 August 1977, S. J. Miller.

Etymology.—This species is named in honor of David R. Smith of the Systematic Entomology Laboratory, USDA, who collected the majority of specimens as well as tens of thousands of Chalcidoidea over many years of trapping for Hymenoptera.

Distribution.—*Zdenekius smithi* ranges from Oregon across the northern U.S. to Virginia and northward into eastern Canada.

Hosts.—Host records are vague but indicate two potential categories of host: primary parasites of solitary, twig-nesting wasps (sphecids and vespids) and/or facultative hyperparasites of dipterous or possibly hymenopterous parasites of these wasps. Two specimens (collected under U.S. Forest Service Hopkins Numbers) were reared in Oregon from nodes of *Alnus rubra*, which also produced *Anthrax irroratus* Say (Diptera: Bombyliidae). This fly is a known parasite of aculeate wasps. Another specimen (also under Hopkins Number) was reared in Virginia from a "dead soft and rather dry willow limb" which "contained a number of yellow larvae." These larvae, which were in cells with aphids, were thought to be crabronine sphecids. Also present were some white larvae thought to be ichneumonids. One specimen of *Zdenekius smithi* and 2 specimens of an unidentified ichneumonid were reared from this material. Two additional specimens were reared in Maryland from a nest of *Odynerus canadensis* (Vespidae, original rearing given as *Symmorphus debilis*). This is a twig-nesting aculeate with numerous recorded parasites (see Krombein [1967] for biology of the wasp, and Krombein [1979] for summary of nest associates) so that no definite host can be pinpointed.

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